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A NEW AFROTROPICAL GENUS OF THE BITING MIDGE TRIBE CERATOPOGONINI (DIPTERA: CERATOPOGONIDAE)

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Abstract.—***Bothahelea*** Grogan and Wirth, a new genus from Zimbabwe closely related to *Brachypogon,* is described and illustrated; it includes two new species, ***phelpsi*** Grogan and Wirth as type-species, and ***gigantostyla*** Grogan and Wirth.

For several years we have been working on a revision of the genera of biting midges that have been placed in the tribes Ceratopogonini and Stilobezziini (see Wirth et al., 1974, 1977). More intensive study of previously described genera, with examination of new characters and differing combinations of characters, has indicated that some genera must be shifted between these tribes or that the tribal separation cannot be maintained (see de Meillon and Wirth, 1979; Wirth and Wada, 1979; Grogan and Wirth, 1980). In addition, new genera have recently been discovered and described whose tribal placement has been difficult (Grogan and Wirth, 1980; de Meillon and Wirth, 1981).

We have recently received for study a collection of biting midges taken by Dr. R. J. Phelps of the University in Zimbabwe in Salisbury that contained two undescribed species of Ceratopogonini that cannot readily be assigned to any of the described genera. To make the names available for discussions on supergeneric taxonomy we are here proposing a new genus for them.

For general terminology of Ceratopogonidae see Wirth (1952) and Wirth et al. (1977); terms dealing with male genitalia are those of Snodgrass (1957); those dealing with antennal sensilla follow Wirth and Navai (1978). We would also refer the reader to an excellent paper on the apparently closely related genus *Brachypogon* Kieffer by Downes (1976) and to a review of that genus by Wirth and Blanton (1970).

Bothahelea Grogan and Wirth, New Genus

Type-species, *Bothahelea phelpsi,* by present designation.

Diagnosis.—Small biting midges, wing length 0.9–1.0 mm. Eyes pubescent; separated. Antenna with first flagellomere bearing a single apical sensilla basiconica, not coeloconica; male flagellomeres separate, not fused. Palpus 5-segmented; 3rd segment with well-defined pit. Female claws long, subequal, with long basal inner teeth. Wing with 2 radial cells, 2nd twice as long as 1st; vein M2 complete to base; costa extending 0.65–0.70 of wing length. Fourth tarsomeres

cylindrical. One large spermatheca. Male genitalia large and bulbous, without long apicolateral processes on 9th tergum; claspettes divided; aedeagus with 3 or more apical projections.

Discussion.—*Bothahelea* closely resembles some species of *Brachypogon* in having a single spermatheca, and it further resembles that genus in the form of its tarsi and claws. It differs from all species of *Brachypogon,* however, in having sensilla basiconica on the first flagellomere, wing with the second radial cell twice as long as the first, vein M2 complete to base, and the flagellomeres of the male antenna separate, not fused.

Bothahelea is similar to *Ceratopogon* Meigen and *Macrurohelea* Ingram and Macfie by virtue of its wing with two well developed radial cells and the separate flagellomeres of the male antenna. *Bothahelea* differs from those two genera, however, in having only a single spermatheca, cylindrical fourth tarsomeres, and sensilla basiconica on the first antennal flagellomere.

Usually, the genera of the tribe Ceratopogonini possess sensilla coeloconica on the first flagellomere of the antenna. Instead of the typical sensilla coeloconica ringed by fringing setae, *Bothahelea* possesses sensilla basiconica similar to those of the pantropical genus *Nannohelea* Grogan and Wirth (1980). The sensilla basiconica in *Bothahelea* and *Nannohelea* are in the same position on the first flagellomere as the sensilla coeloconica in typical Ceratopogonini. Furthermore, in a recent paper dealing with antennal sensilla of ceratopogonids by Wirth and Navai (1978), they state: "sensilla coeloconica are peg organs sunken into depressions of the body wall. All gradations exist in the depth of the pit and the relative size of the central peg, so this type of organ grades imperceptibly into typical sens. basiconica." Because of this fact, we recognize *Bothahelea* and *Nannohelea* as examples of genera that have undergone just such a modification as described by Wirth and Navai. In our opinion, *Bothahelea* and *Nannohelea* belong to the tribe Ceratopogonini and represent genera in which the sensilla coeloconica have lost their surrounding ring of setae and the central peg has become elongated.

Etymology.—The generic name *Bothahelea* is an eponym in honor of our good friend and colleague Botha de Meillon in recognition of his outstanding contributions to our knowledge of South African Ceratopogonidae during the past 50 years.

Bothahelea phelpsi Grogan and Wirth, New Species

Fig. 1, 2a–d

Holotype female.—Wing length, 0.89 mm; breadth, 0.31 mm.

Head: Brown. Eyes (Fig. 1d) narrowly separated, pubescent. Antennal pedicel dark brown; flagellum (Fig. 1a) lighter brown; proximal 6 flagellomeres globose, distal 7 more elongate; 1st flagellomere with a single apical sensilla basiconica; all flagellomeres with a single whorl of sensilla chaetica; proximal 8 flagellomers with central whorl of sensilla trichodea; distal 5 flagellomeres with scattered sensilla basiconica; lengths of flagellomeres in proportion of 10-6-6-6-6-7-8-8-12-12-13-14-20; antennal ratio 1.24. Palpus (Fig. 1c) light brown; lengths of segments in proportion of 4-7-10-6-3; 3rd segment with moderately deep pit containing capitate sensilla; palpal ratio 2.0. Mandible (Fig. 1g) with 9–10 small coarse teeth on inner margin.

Thorax: Brown; scutellum with 3 bristles. Legs (Fig. 1e) light brown; femora

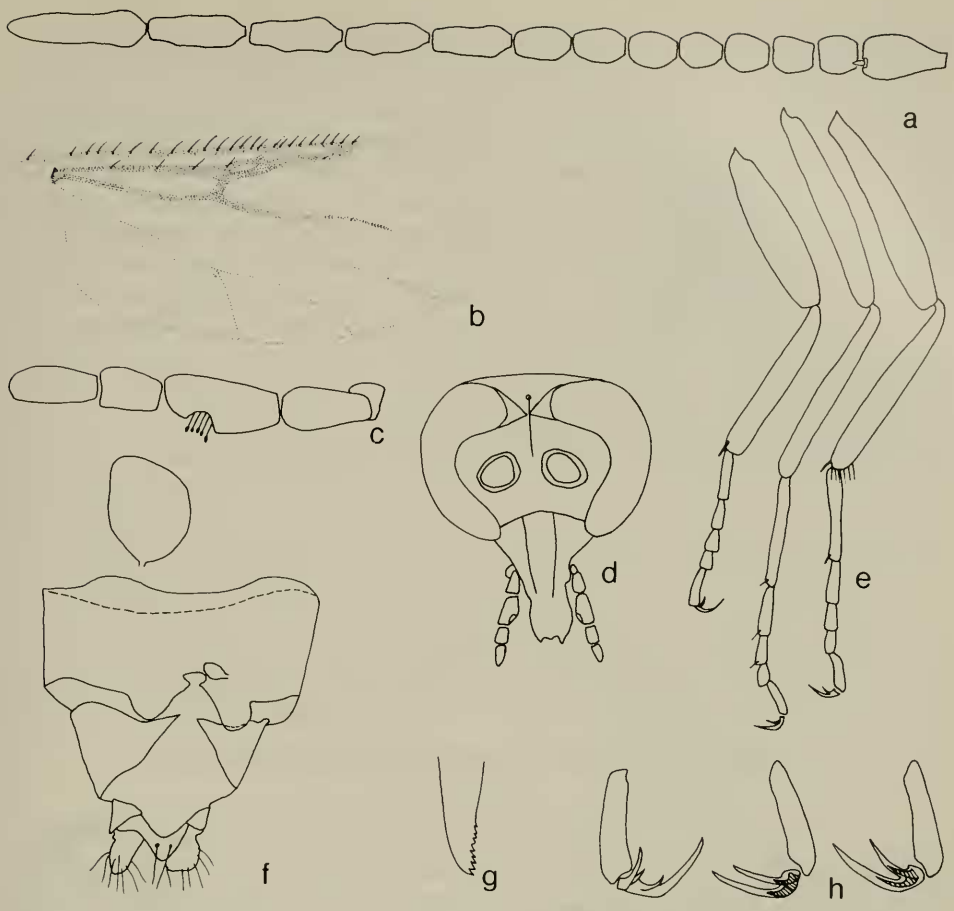

Fig. 1. *Bothahelea phelpsi,* female. a, Antenna. b, Wing. c, Palpus. d, Head, anterior view. e, Fore-, mid-, and hindlegs (left to right). f, genitalia. g, Mandible. h, Fifth tarsomeres and claws of fore-, mid-, and hindlegs (left to right).

and tibiae covered with sparse, scattered, rather stout setae; hindtibial comb with 8–9 large setae; tarsi pale, palisade setae present only on hindbasitarsus; 4th tarsomeres cylindrical; 5th tarsomeres (Fig. 1h) slender with moderately long subequal claws, each bearing a long basal inner tooth. Wing (Fig. 1b) rather broad with rounded tip, hyaline; covered with microtrichia, macrotrichia restricted to fringe and a few sparsely set on radial veins; 2 slender radial cells present, 2nd twice as long as 1st, radial veins rather thickened; media petiolate, forking at level intermediate between radial cells; mediocubital fork at level of r-m cross-vein; 2 very faint anal veins present; anal lobe well developed; costal ratio 0.67. Halter pale.

Abdomen: Light brown. Genitalia as in Fig. 1f. Eighth segment a complete ring as in *Brachypogon,* heavily sclerotized, sternal portion cleft posteriorly with short rounded extensions. Ninth sternum divided into 2 slender pointed arms. Tenth sternum with only a single pair of large setae. A single large spermatheca measuring 0.090 by 0.060 mm with large punctations and short neck. A small vestigial

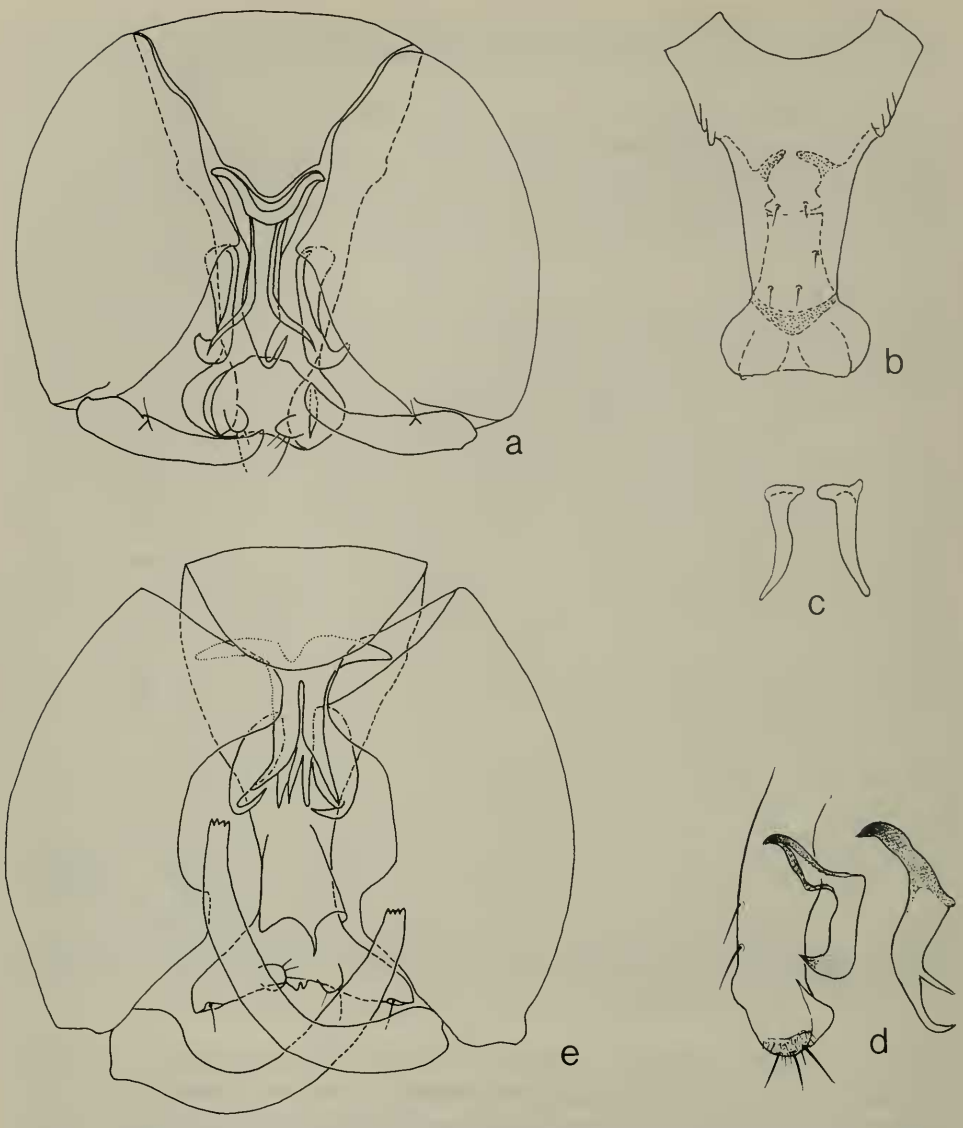

Fig. 2. *Bothahelea* spp., male genitalia. a–d, *B. phelpsi*. e, *B. gigantostyla*. a, e, Genitalia, ventral view. b, Ninth tergum, dorsal view. c, Claspettes, ventral view. d, Aedeagus, claspettes and distal portion of ninth tergum (left to right), side view.

spermatheca also present, measuring 0.020 mm long, with numerous large punctations.

Allotype male.—Wing length, 1.12 mm; breadth, 0.35 mm. Similar to female with following sexual differences: Flagellum with proximal 9 flagellomeres globose, distal 4 elongated; all flagellomeres separate, not fused; plume well-developed, moderately dense. Legs more bristly in appearance due to greater number of coarse setae; claws small, equal-sized, with bent bifid tips. Wing more slender, 2nd radial cell broader; costal ratio 0.61.

Genitalia (Fig. 2a–d): Ninth sternum 1.4× broader than long, base slightly curved; 9th tergum (Fig. 2b) tapering gradually distally to 0.75 of its length, then expanding to a broader clublike tip bearing short cerci and extending just beyond basimeres. Basimere 1.5× as long as broad, nearly straight; telomere about 1/2 length of basimere, tapering slightly distally to a broadly pointed tip. Aedeagus 1.6× longer than broad, basal arch very short, only 0.13 of total length: basal arm heavily sclerotized, slightly recurved; distal portion more lightly sclerotized, with 2 slender lateral subapical extensions and a single slender apical extension that bends under ventrally (Fig. 2d). Claspettes (Fig. 2c–d) separate, lightly sclerotized, consisting of slender arms with a broad tip recurved about 120°.

Distribution.—Zimbabwe; known only from the type-locality.

Types.—Holotype ♀, allotype ♂, Zimbabwe, Gokwe Area, i.1981, R.J. Phelps, truck trap (Type no. 72221, USNM). Paratypes 3 ♀, 21 ♂, same data as types (deposited in British Museum (Nat. Hist.). London; Museum National d'Histoire Naturelle, Paris; Natal Museum, Pietermaritzburg, South Africa; South African Institute of Medical Research, Johannesberg; and National Museum of Zimbabwe, Salisbury).

Discussion.—The species is named in honor of the collector, R. J. Phelps of the University of Zimbabwe in Salisbury, in appreciation of his continued interest in the collection and study of Afrotropical biting midges.

Bothahelea phelpsi is a smaller species than *B. gigantostyla,* the setae on the legs are more strongly developed, spinelike, and the two species differ in many features of the male genitalia, as can be seen by comparing the figures.

Bothahelea gigantostyla Grogan and Wirth, New Species

Fig. 2e

Holotype male.—Wing length, 1.02 mm; breadth, 0.23 mm.

Head: Brown. Eyes narrowly separated, pubescent. Antennal pedicel dark brown; flagellum light brown; proximal 9 flagellomeres globose, distal 4 elongated; proximal 10 flagellomeres with moderately dense plume of long sensilla chaetica, flagellomeres 11 and 12 with sub-basal whorl; 1st flagellomere with a single apical sensilla basiconica; proximal 10 flagellomeres with subapical whorl of sensilla trichodea, distal 3 flagellomeres with a few scattered sensilla basiconica; lengths of flagellomeres in proportion of 22-10-9-8-8-8-8-9-11-16-19-23; antennal ratio (13–11/1–10) 0.57. Palpus light brown; lengths of segments in proportion of 4-7-11-6-9; 3rd segment with distinct subapical pit bearing capitate sensilla; palpal ratio 2.4.

Thorax: Dark brown; scutellum with 4 bristles. Legs brown, tibiae paler than femora: femora and tibiae with sparse scattered setae, much fewer in number and shorter than in males of *Bothahelea phelpsi*; hindtibial comb with 8–9 large setae; tarsi pale, palisade setae present only on hindbasitarsus; 4th tarsomeres cylindrical, 5th tarsomeres slender with small equal-sized claws with bent bifid tips. Wing very similar to that of *B. phelpsi* (Fig. 1b), except more slender and 2nd radial cell broader; costal ratio 0.62. Halter pale.

Abdomen: Dark brown. Genitalia (Fig. 2e) with 9th sternum nearly twice as broad as long, base slightly curved; 9th tergum tapering gradually distally then expanding to very broad winglike tip that extends to just below tip of basimeres and bears short cerci. Basimere nearly twice as long as broad, greatly curved with

basal and distal mesal projections; telomere 0.67 length of basimere, greatly curved, tapering slightly distally to broad tip bearing 4–5 small points. Aedeagus about as long as broad, basal arch very short, only 0.2 of total length; basal arms heavily sclerotized, recurved 90°; distal portion also heavily sclerotized with 2 curving ventral apical processes and 3 straighter, more dorsal processes. Claspettes divided, lightly sclerotized, consisting of 2 broad straight pieces that taper into slender apical processes recurved ventrally.

Distribution.—Zimbabwe; known only from the type-locality.

Type.—Holotype ♂, Zimbabwe, Gokwe Area, i.1981, R. J. Phelps, truck trap (Type no. 72224, USNM).

Discussion.—The specific epithet *gigantostyla* is from the Greek—*gigas* (*giganto-*) (giant) and *stylos* (a pillar) in reference to the unusual large male genitalia of this species. The distinctive male genitalia are sufficient to distinguish this species from its only known congener, *B. phelpsi*.

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